ABSTRACT OF THE DISCLOSURE

A method of using scatterometric techniques to control stepper process is disclosed. In one illustrative embodiment, the method comprises providing a library of optical characteristic traces, each of which corresponds to a grating structure comprised of a plurality of features having a known profile, and forming a plurality of grating structures in a layer of photoresist, each of said formed grating structures being comprised of a plurality of features having an unknown profile. The method further comprises illuminating the formed grating structures, measuring light reflected off of each of the formed grating structures to generate an optical characteristic trace for each of the formed grating structures, comparing each of said generated optical characteristic traces to at least one optical characteristic trace from the library, and modifying at least one parameter of a stepper exposure process to be performed on at least one subsequently processed wafer based upon the comparison of the generated optical characteristic traces and the optical characteristic trace from the library. In another embodiment, the generated optical characteristic traces for the grating structures are compared to a target optical characteristic trace for the grating structures, and at least one parameter of an exposure process to be performed on a layer of photoresist formed on a subsequently processed wafer may be determined or modified based upon this comparison.